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EXAMINER	
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ART UNIT	PAPER NUMBER
4128	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/528,822	CROUSE ET AL	
	Examiner	Art Unit	
	MAYA CLARK	4128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 March 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *29-51* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *29-51* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 March 2005* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *6 July 2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to because of the following minor informalities: figure 2a and 2b are not labeled completely. Figure 2a refers to a diode laser and figure 2b refers to a carbon dioxide laser. Furthermore, figure 4 refers to a carbon dioxide laser and plain concrete. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The abstract of the disclosure is objected to because of the following informality: no drawing should be placed on the abstract page. Correction is required. See MPEP § 608.01(b).

3. The disclosure is objected to because of the following informality: the depth labeling for figure 1 discussed on page 10-lines 19-20 and page 11, lines 22-27 are not in agreement.

Appropriate correction is required.

4. The incorporation of essential material (JP-A-63157778 and JP-A-62181898 discussed on page 2-3) in the specification by reference to an unpublished U.S. application, foreign application or patent, or to a publication is improper. Applicant is required to amend the disclosure to include the material incorporated by reference, if the material is relied upon to overcome any objection, rejection, or other requirement imposed by the Office. The amendment must be accompanied by a statement executed by the applicant, or a practitioner representing the applicant, stating that the material being inserted is the material previously incorporated by reference and that the amendment contains no new matter. 37 CFR 1.57(f).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which

said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 29, 30, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Kuwahara reference et al (JP 62-181898), hereinafter Kuwahara in view of Hamasaki et al (US 4568814), hereinafter Hamasaki.

Kuwahara discloses a method for cutting cement-based materials. This method consists of mutually traversing a surface to be cut with a laser beam at a power density sufficient to produce a desired depth of molten material (see Kuwahara- paragraphs 1-2 on page 2; paragraphs 2-4 on page 4; paragraphs 1-2,5 on page 8).

The Kuwahara reference is different in that it fails to disclose a method wherein the laser cut does not produce a maximum depth of 10 mm at each traverse.

Attention is directed to the Hamasaki reference which discloses a method for dismantling of a biological shield wall of concrete in a nuclear reactor. The Hamasaki reference is capable of cutting various types of cement in order to produce a depth of molten material having a maximum depth of 10 mm at each traverse (see Hamasaki: col.1, lines 56-60). The Hamasaki method serves as an effective way to easily and safely cut to the desired depth (see Hamasaki: col.2, lines 8-11).

It would have been obvious to have modified the modified Kuwahara reference to include laser cutting method of Hamasaki because of its ease in cutting difficult types of cement based material thereby making the cutting process more efficient.

Regarding claim 30, the modified Kuwahara reference discloses a method wherein a plurality of traverses are made along substantially the same cutting path (see Kuwahara: paragraphs 3-4 on page 4).

Regarding claim 34, the modified Kuwahara reference discloses a method wherein the material is removed directly after solidification after each pass (see Kuwahara: paragraphs 4-5 on page 8).

7. Claims 31 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over the modified Kuwahara reference in view of Rizoiu et al (US 6231567 B1), hereinafter Rizoiu.

Regarding claim 31, the modified Kuwahara reference differs in that it fails to disclose a method wherein the laser beam is unfocused.

Attention is directed to the Rizoiu reference which discloses a method capable of generating a laser beam that is unfocused (see Rizoiu-col.10, line 3). An unfocused laser beam would provide a low laser power density needed to produce the required small depth of cement based molten material.

It would have been obvious to have modified the modified Kuwahara reference to include the method of Rizoiu because the unfocused laser beam is sufficient enough to produce a small depth of the desired molten material such as 10 mm thereby making the cutting process more efficient.

Regarding claim 45, the modified Kuwahara reference differs in that it fails to disclose a method wherein the laser beam is delivered by a fiber optic cable.

Rizoiu discloses a method characterized in that the laser beam is emitted from a fiber optic cable and applied to the desired target area (see Rizoiu-col. 4,

lines 10-12; col.6, lines 34-36). This method serves as an effective way in directing the laser beam from the laser source to the target location.

It would have been obvious to have modified the modified Kuwahara reference to include the method of Rizoiu due to the ease in guiding the laser beam from the laser source to the target location.

8. Claims 32, 44, 46, and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over the modified Kuwahara reference in view of Dyson et al. (US 4380694), hereinafter Dyson.

Regarding claims 32 and 50, the modified Kuwahara reference differs in that it fails to disclose a method and device wherein the laser beam is a parallel beam.

Attention is directed to the Dyson reference which discloses a method characterized in that the laser beam is a parallel beam (see Dyson: col.2, lines 13-14). The Dyson method serves as an easy method of generating a parallel beam without the use of complicated laser optic devices.

It would have been obvious to have modified the modified Kuwahara reference to include the method of Dyson to generate a parallel laser beam since a parallel laser beam is easy to direct to the cement based material that is being cut thereby making the cutting process more efficient.

Regarding claim 44, the modified Kuwahara reference differs in that it fails to disclose a method wherein the laser source is selected from a group consisting of a COIL, Nd:YAG, carbon dioxide or diode laser.

Attention is directed to the Dyson reference which discloses the use of a carbon dioxide laser or a similar high powered laser for cutting difficult materials (see Dyson: col.1, lines 4-7).

It would have been obvious to have modified the modified Kuwahara reference to include the method of Dyson to use a carbon dioxide laser for cutting the cement as carbon dioxide lasers are known to be capable of cutting difficult to cut materials, thereby increasing cutting efficiency.

Regarding claim 46, the modified Kuwahara reference differs in that it fails to disclose a method wherein the laser beam is delivered by a mobile beam delivery system comprising a system of more than one reflecting mirror.

Attention is directed to the Dyson reference which discloses a method characterized in that the laser beam is delivered by a mobile beam delivery system comprising a system of reflecting mirrors (see Dyson: col.2, lines 8-19). The Dyson method serves as an easy and relatively inexpensive method to direct the laser beam to the cement based material that will be cut.

It would have been obvious to have modified the modified Kuwahara reference to include the method of Dyson to use a mobile beam delivery system since it is effective in accurately delivering the laser beam to the material being cut.

9. Claims 33 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over the modified Kuwahara reference in view of Chang et al (US 6864459 B2), hereinafter Chang.

Regarding claims 33 and 51, the modified Kuwahara reference differs in that it fails to disclose a method and device wherein the laser beam has a circular or rectangular cross section.

Attention is directed to the Chang reference which discloses a laser system capable of generating a laser beam with a rectangular, square or circular cross section (see Chang: col.4, lines 31-34). Chang's ability to generate different types of cross sectional laser beams allows for better accuracy when cutting rectangular or circular materials.

It would have been obvious to have modified the modified Kuwahara reference to include the method and device pf Chang due to its versatility in generating round or rectangular type laser beams, thereby increasing cutting accuracy.

10. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over the modified Kuwahara reference in view of Sugita et al (JP 63-57778), hereinafter Sugita.

The modified Kuwahara reference differs in that it fails to disclose a method wherein the solidified material is broken up by a hollow crushing tube which also serves as a material extractor conduit.

Attention is directed to the Sugita reference which discloses a laser cutting method characterized in that the method uses a hollow tubular like fragmentation agent capable of breaking up cement based material (see-Sugita page 3; lines 31-33 and figure 1-label 9). This crushing method is very easy and convenient.

It would have been obvious to have modified the modified Kuwahara reference to include the method of Sugita due to its ease in crushing the solidified cement based material, thereby increasing efficiency.

11. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over the modified Kuwahara reference.

The modified Kuwahara reference differs in that it does not specifically disclose a method wherein the depth of the molten material at each pass lies in the range from 0.5 to 5mm.

It, however, would have been an obvious matter of design choice to a person of ordinary skill in the art to have the depth of the molten material to be in a range between 0.5 and 5mm because discovering a workable depth range would have been a mere design consideration based on the desired cutting depth. Such a modification would have involved only routine skill in the art to accommodate the molten material depth requirement. It is noted that discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1995)).

12. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over the modified Kuwahara reference in witness of Cement and Concrete Faqs.

The modified Kuwahara reference fails to explicitly state the amount of pressure required for crushing solidified cement based material.

It is well known to one of ordinary skill in the art that the pressure required to break conventional concrete is around 48 megapascals. As a result, it would have been an obvious matter of design choice to one of ordinary skill in the art to

modify the modified Kuwahara reference to include a crushing pressure of less than 100 megapascals since the applicant has not disclosed that having a crushing pressure up to 100 megapascals solves any stated problem or is for any particular purpose, and it appears that the modified Kuwahara device can handle a crushing pressure of less than 100 megapascals (Cement and Concrete Faqs, page3).

13. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over the modified Kuwahara reference.

The modified Kuwahara reference differs in that it does not specifically disclose a method wherein the laser power density lies in the range of 300 W per cm2 to 3000 W per cm2.

It, however, would have been an obvious matter of design choice to a person of ordinary skill in the art to have the laser power density to be in a range between 300 W per cm2 to 3000 W per cm2 because discovering a workable power density range would have been a mere design consideration based on the desired amount of laser power that needs to be generated. Such a modification would have involved only routine skill in the art to accommodate the laser power density requirement. It is noted that discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1995)).

14. Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over the modified Kuwahara reference.

The modified Kuwahara reference differs in that it does not specifically disclose a method wherein the beam traverse speed lies in the range of 3 centimeters per minute and 30 centimeters per minute.

It, however, would have been an obvious matter of design choice to a person of ordinary skill in the art to have a beam traverse speed to be in a range between 3 centimeters per minute and 30 centimeters per minute because discovering a workable traverse beam would have been a mere design consideration based on the desired speed of the laser beam output. Such a modification would have involved only routine skill in the art to accommodate the beam traverse speed requirement. It is noted that discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1995)).

15. Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over the modified Kuwahara reference in view of Steen (US 4167662), hereinafter Steen.

The modified Kuwahara reference differs in that it does not specifically disclose a method wherein an oxygen jet is applied directly at the beam spot when reinforcing steel bars are being cut.

Attention is directed to the Steen reference which discloses a laser cutting device and method which employs an oxygen jet to assist the laser beam in cutting cement based material reinforced with steel bars (see Steen: col.1, lines 14-19). The Steen method serves as an effective method of cutting through tough reinforced material.

It would have been obvious to have modified the modified Kuwahara reference to include the method of Steen since that method is capable of cutting cement based materials reinforced with stronger supports, thereby providing a means to cut rebar and the like.

16. Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over the modified Kuwahara.

The modified Kuwahara reference differs in that it does not specifically disclose a method wherein the surface temperature of the material being treated lies in the range of 700° C to 2400° C.

It, however, would have been an obvious matter of design choice to a person of ordinary skill in the art to have the surface temperature of a material to lie in a range between 700° C to 2400° C because discovering a workable surface temperature range would have been a mere design consideration based on the type of cement based material being cut. Such a modification would have involved only routine skill in the art to accommodate the surface temperature requirement. It is noted that discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1995)).

17. Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over the modified Kuwahara reference.

The modified Kuwahara reference differs in that it does not specifically disclose a method wherein the vapor-to-melt ratio lies in the range between 0.05 and 3.

It, however, would have been an obvious matter of design choice to a person of ordinary skill in the art to have the vapor-to-melt ratio in a range between 0.05 and 3 because discovering a workable vapor-to-melt ratio would have been a mere design consideration based on the type of cement based material being laser cut. Such a modification would have involved only routine skill in the art to accommodate the vapor-to-melt ratio requirement. It is noted that discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1995)).

18. Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over the modified Kuwahara reference.

The modified Kuwahara reference differs in that it does not specifically disclose a method wherein the material removal rate lies in the region of 150 per cm3.kWh for a diode laser and 100 per cm3.kWh for a CO2 laser.

It, however, would have been an obvious matter of design choice to a person of ordinary skill in the art to have the rate of material removal to lie in a region of 150 per cm3.kWh for a diode laser and 100 per cm3.kWh for a CO2 laser because discovering a workable rate of material removal would have been a mere design consideration based on the type of laser source that is being used. Such a modification would have involved only routine skill in the art to accommodate the rate of material removal requirement. It is noted that discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1995)).

19. Claim 47 is rejected under 35 U.S.C. 103(a) as being unpatentable over the Kuwahara reference in view of Hamasaki and in further view of Rizoiu.

Kuwahara discloses a method for cutting cement-based materials. This method consists of mutually traversing a surface to be cut with a laser beam at a power density sufficient to produce a desired depth of molten material (see Kuwahara- paragraphs 1-2 on page 2; paragraphs 3-4 on page 4; paragraphs 1-2,5 on page 8).

The Kuwahara reference differs in that it fails to disclose a method wherein the laser cut does not produce a maximum depth of 10 mm at each traverse.

Attention is directed to the Hamasaki reference which discloses a method for dismantling of a biological shield wall of concrete in a nuclear reactor. The Hamasaki reference is capable of cutting various types of cement in order to produce a depth of molten material having a maximum depth of 10 mm at each traverse (see Hamasaki- col.1, lines 56-60). The Hamasaki method serves as an effective way to easily and safely cut to the desired depth (see Hamasaki- col.2, lines 8-10).

It would have been obvious to have modified the modified Kuwahara reference to include laser cutting method of Hamasaki because of its ease in cutting difficult types of cement based material thereby making the cutting process more efficient.

Furthermore, the modified Kuwahara reference differs in that it fails to disclose a method wherein the laser beam is unfocused.

Attention is directed to the Rizoiu reference which discloses a method capable of generating a laser beam that is unfocused (see Rizoiu-col.10, line 3). An unfocused laser beam would provide a low laser power density needed to produce the required small depth of cement based molten material.

It would have been obvious to have modified the modified Kuwahara reference to include the method of Rizoiu because the unfocused laser beam is sufficient enough to produce a small depth of the desired molten material such as 10 mm thereby making the cutting process more efficient.

20. Claims 48-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over the modified Kuwahara reference in view of Sugita.

The modified Kuwahara reference differs in that it fails to disclose a device wherein the means for breaking resolidified material comprises a percussive member for crushing the material.

Attention is directed to the Sugita reference which discloses a laser cutting device consisting of a percussive member for crushing the material (see-Sugita page 3; lines 31-33). This crushing method is very easy and convenient.

It would have been obvious to have modified the modified Kuwahara reference to include the device of Sugita due to its ease in crushing the solidified cement based material, thereby increasing efficiency.

Regarding claim 49, the modified Kuwahara reference differs in that it fails to disclose a device wherein the percussive member is hollow and crushed material is removed through the member by suction means.

Attention is directed to the Sugita reference which discloses a device characterized in that the device consists of a hollow tubular like fragmentation agent capable of breaking up cement based material (see-Sugita page 3; lines 31-33 and figure 1-label 9). The crushed material is then sucked through the fragmentation agent by way of a suction pipe (see-Sugita page 7; line 36). This device serves as a simple way to extract the crushed material.

It would have been obvious to have modified the modified Kuwahara reference to include such a device due to its ease in removing the crushed material, thereby increasing efficiency.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MAYA CLARK whose telephone number is (571)270-5605. The examiner can normally be reached on Monday through Friday, 10 am to 6:00 pm (First Friday Off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Khoa Huynh can be reached on (571)272-4888. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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